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PROPERTIES OF BLENDED FABRIC MADE FROM BAMBOO AND ERI SILK FIBRES

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ABSTRACT

In the present study an attempt was made to develop fabrics using regenerated bamboo with erisilk blended yarn of three different ratios viz., 20:80, 50:50 and 80:20 on a fly shuttle handloom. Further, the newly designedblended fabrics were evaluated for physical properties. It was found that the woven blended bamboo-eri fabrics can successfully use as apparel as well as value added products. Overall the results indicated that Blended yarns from natural and man-made fibres have the particular advantage of successfully combining the good properties of both fibre components, such as comfort of wear with easy care properties. These advantages also permit an increased variety of products to be made, and yield a stronger marketing advantage.

KEYWORDS: Blending, Eri Silk, Mechanical and Functional Properties, Regenerated Bamboo, Twill Weave

INTRODUCTION

Fiber blending has been a common practice in the textile industry for a long time, stimulated to a great degree by the availability of an ever increasing number of manmade fibers. Fiber blending can achieve quality products that cannot be realized using one fiber type alone, and it can also reduce the cost by substituting a less expensive fiber for a more costly one. Natural fibers have unique properties compared to synthetic fibers. The manufacturing processes, the characteristics, and the blending traits are considered in producing high performance athletic wear. Comfort properties, such as air transfer, moisture transfer, and wickability, are essential when it comes to athletic wear. Through examining the uniqueness of natural fibers, the advantages and benefits of using a higher percentage of natural fibers when manufacturing comfortable and functional high performance athletic wear can be obtained.

The reasons for development of blends are economy or economic reasons; expensive fibres can be extended by blending them with more plentiful fibres. In respect of durability, blended fabric shows better performance. Blending different types of fibres is a widely practiced means of enhancing the performance and the aesthetic qualities of a fabric. Blended yarns from natural and man-made fibres have the particular advantage of successfully combining the good properties of both fibre components, such as comfort of wear with easy care properties. These advantages also permit an increased variety of products to be made, and yield a stronger marketing advantage. Hence the present work has been conducted with the objectives to blend regenerated Bamboo fibre with eri silk, and to construct fabric using blended yarn and evaluate their properties to produce value added products.

MATERIALS AND METHODS

Table 1: Details of Fibres Selected for the Study

English Name	Local Name	Scientific Name	Family
Moso Bamboo	Baah	*Phyllostachyspubscents*	poaceae
Erisilk	Eri	*Samiaricini*	satturniidae

Bamboo fibre is regenerated cellulosic fibre produced from bamboo. The type of bamboo used for apparels is Moso bamboo (*Phyllostachyspubscents).*Eri silk belongs to either of two species namely *Philosomiaricini* or *philosomiacynthia* is a wild species while Philosomiaricini is a domesticated one reared on castor oil plant leaves to produce a white or brick-red silk popularly known as Eri silk. Eri silk is a fine, dense and course fabric, which absorbs moisture and has good elasticity. It is a strong, soft and heavier silk which drapes well. As the raw material of bamboo and silk are differ, and also the basic fiber properties vary, hence they need to undergo different processes till they are suitable for good blending. The silk is always available in cocoon form. These cocoons contain sericin gum which is to be removed for further smooth processing. So the first process is degumming further followed by other processes. Both the fibres were blend in carding and drawing stage and Yarns of three different blends along with 100% bamboo and silk yarn were produced after proper blending. The blend proportion of prepared yarns samples were 20:80, 50:50 and 80:20 of bamboo/silk . The yarns produced were then wound to form cones. The controlled and blended fabrics were weaved in the Fabric plus industry Private Ltd. Guwahati, Assam. From the different blended yarn, fabrics were constructed using twill weave. Blended yarns of different ratios were used for making fabrics in both warp and weft. The nomenclature of the fabric sample was done according to the blend proportions.

Table 2: Constructional Details of Regenerated Bamboo and Mulberry Silk Blended Fabrics

Sl. No	Sample	Weave	Nomenclature of samples	Types of loom	Yarn count	Composition Warp weft % %	Reed count	Loom pick	Cloth width
1	Bamboo 100%	Twill	BT	Handloom (Fly Shuttle Loom)	1/60 s	Same in both way	48	54	36”
2	Eri 100 %	Twill	ET		1/60 s	Same in both way	48	54	36”
3	Bamboo Eri 20:80	Twill	BET 20:80		1/60 s	Same in both way	48	54	36”
4	Bamboo Eri 50:50	Twill	BET 50:50		1/60 s	Same in both way	48	56	36”
5	Bamboo Eri 80:20	Twill	BET 80:20		1/60 s	Same in both way	48	54	36”

RESULTS AND DISCUSSIONS

Evaluation of Fabrics Geometrical Properties

Table 3: Count and Cover Factor of Blended Fabrics (Numerical)

Test Fabric	Fabric Count		Cover Factor		Cloth Cover
	Warp Way	Weft Way	Warp Way	Weft Way	
BT	68	66	8.78	8.52	14.63
ET	66	70	8.52	9.04	14.81
BET 20:80	68	74	9.04	9.56	15.52
BET 50:50	66	78	8.52	10.07	15.73
BET 80:20	64	76	8.26	9.07	15.64

It was evident from the Table 3, that all the woven samples of the twill weave have more or less similar in their fabric count. The maximum count in warp way was observed in the sample BT control (68)) and the he minimum values (64) were found in BET 80:20 samples. This may be due to the weaving process. In case of weft direction BET 50:50 shows highest count (78) and lowest was in BT (66). From the table 3 maximum warp way cover factor sample BET20:80 (9.04) and minimum cover factor (8.26) was obtained from the sample BET 80:20. From the table it was seen that the weft way cover factor was highest in case of BET 50:50(10.07) and the lowest cover factor was found in sample BT(8.52). In case of the total cloth cover of the all twill weave test fabrics, the highest cloth cover was found in sample BET 50:50 (15.73) and lowest was found in sample BT(14.63).

Table 4: Thickness (Mm), Stiffness (Cm) and Crease Recovery (Degree) of Blended Fabric

Test Fabric	Thickness (Mm)	Stiffness(Cm)		Crease Recovery (Degree)	
		Warp	Weft	Warp Way	Weft Way
BT	0.26	2.50	2	101.25	107.18
ET	0.30	3.10	2.85	89.75	105
BET 20:80	0.32	3.05	2.10	102	124
BET 50:50	0.35	2.85	2.50	109	112.80
BET 80:20	0.34	2.40	2.40	104	130.25
CD	0.76	0.14		0.64	1.57
CV%	0.41	3.30		0.34	0.75

The table 4shows the maximum thickness was observed in the sample BET 50:50 (0.35mm). It was recorded that all the blended samples increases in fabric thickness compared to the controlled sample. It may be due to the different fibre and the blend ratio of the yarn. Again the stiffness of twill weave fabrics in warp way shows that, ET control sample have a highest bending length (3.10 cm), followed by sample BET 20:80 (3.05 cm) and lowest was found in sample BET 80:20 (2.40cm) respectively in warp direction. In case of weft way, sample ET (2.85cm) has registered maximum bending length and minimum was observed in sample BT (2.00 cm). It was interesting to note that the stiffness of eri twill control fabric in both warp and weft directions shows highest stiffness. This may due to the amount of gum present in theerifibre and also due to the thickness of fabric. In case of the crease recovery of the blended fabric result shows that with the increase of bamboo content the recovery angle also increases.

Table 5: Tensile Strength (Kg F) and Elongation(%) of the Blended Fabric

Test Fabric	Tensile Strength(Kg F)		Elongation (%)	
	Warp	Weft	Warp	Weft
BT	50.48	59.03	22.98	24.07
ET	54.22	67.64	24.25	21.69
BET 20:80	65.36	78.05	25.09	23.03
BET 50:50	67.54	82.51	29.56	22.59
BET 80:20	61.68	73.43	23.34	29.16

The result of the tensile strength of twill weave blended fabric, the Table 5, illustrated that among the test samples highest tensile strength (67.54 kg f) was shown by BET 50:50 in warp direction, and the least was exhibited by BT (50.48 kg f). While in weft direction, sample BET 50:50 has a maximum strength (82.51 kg f) and lowest tensile strength was found in BT (59.03 kg f). The highest tensile strength was found in the all blended samples, which may be due to the highest strength of the silk fibres. Again the table showed the elongation of test samples. From the table it was observed that the elongation of all the samples in warp way have more or less difference with each other. The elongation of the blended samples was increased with the increase in silk content.

Table 6: Drape Coefficient and Wicking Height (cm) of the Blended Fabric

Fabrics	Drape Coefficient (%)	Wicking Height (cm)	
		Warp Way (cm)	Weft Way (cm)
BT	46.10	6.04	6.80
ET	51.25	3.20	3.85
BET 20:80	47.22	3.66	3.96
BET 50:50	44.75	3.85	4.02
BET 80:20	42.80	4.22	4.99

It was inferred from the table 6 that the drape coefficient of twill weave controlled and blended fabric samples was more or less same. Drapability of a fabric is combined effect of several factors such as stiffness, flexural rigidity, weight, thickness etc. Stiffness, an attribute of fabric hand is one of the most important factors determining draping quality of fabric e.g. soft fabric drapes closer to the body forming ripples whereas stiff fabric drapes away from the body. (Pant, 2010) However it was highest for eri control twill weave fabric (51.25%) and lowest for blended fabric BMT 80:20 (42.80 %). From the result it was inferred that lower drape coefficient percentage for bamboo eri blended fabrics depicts the good draping behaviour. This may be due to less stiffness of eri silk yarns. Similarlytable depict that the maximum wicking height was seen in bamboo control samples and it was increased with the More the wicking behaviour, more will be the skin comfort, dyeability, dimensional stability and lesser will be the static build-up of the fabric. (Phukan, et al.,1997). Since the bamboo fibre has good absorbency properties, so it may increase the wicking height of the tested samples.

After evaluation of functional properties and based on fabric texture some of the products were prepared. Value added diversified products were designed and constructed by following the drafting methods. Different products like gentskurta, neckties, jacket etc. were made from the blended fabrics.

PRODUCTS MADE FROM BLENDED FABRICS

(Girls Top) **(Kurta)** **(Waist Coat)** **(Cushion cover)**

Figure 1

CONCLUSIONS

From the study it may be conclude that bamboo and silk blended fabrics have good potential for exports owing to their economics, aesthetic appeal and improved functional properties. Quality characteristics of fabrics produced from blending of bamboo and erisilk indicate that these fabrics can be utilised for the manufacture of dress materials and different value added product with distinct characteristics. There is also a vast scope of diversification into the manufacture of home textiles like interior fabrics and furnishings.

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